

We Claim:

1. A convertible refrigerator freezer comprising:

an insulated cabinet having an upper convertible compartment selectively operable by the user as an above freezing refrigerator compartment or as a below freezing freezer compartment, and a lower below freezing freezer compartment;

5 insulation between the upper convertible compartment and the lower freezer compartment;

a refrigerating system for the convertible refrigerator freezer including:

an evaporator mounted adjacent the rear wall of the upper convertible compartment;

10 an evaporator cover forming an evaporator compartment for separating the evaporator from the upper convertible compartment;

an evaporator fan mounted in the evaporator compartment for drawing air from the lower freezer compartment through the insulation between the compartments and from the upper convertible compartment and circulating
15 the air over the evaporator;

an air tower for conveying refrigerated air from the evaporator fan to the lower freezer compartment through the insulation between the compartments; and

20 a control for selectively discharging a first amount of refrigerated air through the evaporator cover to the upper convertible compartment when the control is set for operating the upper compartment as an above freezing refrigerator compartment, or a second larger amount of refrigerated air through the evaporator cover to the upper convertible compartment when the control is set for operating the upper convertible compartment as a freezer compartment.

2. The convertible refrigerator freezer of claim 1 wherein the refrigerating system is frost free and includes a defrost heater adjacent the evaporator and a defrost control for periodically energizing the defrost heater for melting accumulated frost and ice on the evaporator.

3. The convertible refrigerator freezer of claim 1 wherein the evaporator cover includes an inner evaporator cover overlying the evaporator and an insulated outer

evaporator cover separating the evaporator from items stored in the upper convertible compartment.

4. The convertible refrigerator freezer of claim 3 wherein the control for selectively discharging refrigerated air to the upper convertible compartment includes a manually operated control baffle arranged to open or close an air passage allowing refrigerated air to flow from the evaporator through the evaporator cover to cool items stored in the upper convertible compartment.
5. The convertible refrigerator freezer of claim 4 wherein the control includes a rotary knob connected to the manually operated control baffle for rotating the baffle to a first position substantially closing the air passage and to a second position allowing free movement of refrigerated air through the air passage.
6. The convertible refrigerator freezer of claim 1 wherein the lower below freezing freezer compartment comprises more than half of the internal volume of the convertible refrigerator freezer.
7. The convertible refrigerator freezer of claim 6 wherein the lower below freezing freezer compartment comprises approximately 70% of the internal volume of the convertible refrigerator freezer.
8. A refrigerator freezer comprising:
 - an insulated cabinet having an upper compartment operable as an above freezing refrigerator compartment, and a lower below freezing freezer compartment;
 - 5 insulation between the upper compartment and the lower freezer compartment;
 - a refrigerating system for the refrigerator freezer including:
 - an evaporator mounted adjacent the rear wall of the upper compartment;
 - an evaporator cover forming an evaporator compartment for separating
 - 10 the evaporator from the upper compartment;

an evaporator fan mounted in the evaporator compartment for drawing air from the lower freezer compartment through the insulation between the compartments and from the upper compartment and circulating the air over the evaporator;

15 a defrost heater adjacent the evaporator for periodically defrosting the evaporator;

an air tower for conveying refrigerated air from the evaporator fan to the lower freezer compartment through the insulation between the compartments and to the upper compartment;

20 a defrost control for periodically defrosting the evaporator during defrost cycles by energizing the defrost heater; and

a control for adjusting the temperature of the upper compartment including an auxiliary heater for the upper compartment and connected in circuit with an upper compartment thermostat to maintain the temperature in the upper compartment
25 above freezing.

9. The refrigerator freezer of claim 8 wherein the lower below freezing freezer compartment comprises approximately 70% of the internal volume of the refrigerator freezer.

10. The refrigerator freezer of claim 8 wherein the upper compartment is selectively operable by the user as an above freezing refrigerator compartment or as a below freezing freezer compartment, and the control includes a manually operated control baffle for selectively discharging a first amount of refrigerated air
5 through the evaporator cover to the upper compartment when the control is set for operating the upper compartment as an above freezing refrigerator compartment, or a second larger amount of refrigerated air through the evaporator cover to the upper compartment when the control is set for operating the upper compartment as a freezer compartment.

11. The refrigerator freezer of claim 10 wherein the auxiliary heater is connected to be energized by the defrost control in addition to the defrost heater during defrost cycles when the control is set for freezer operation.

12. The refrigerator freezer of claim 8 wherein the evaporator cover includes an inner evaporator cover overlying the evaporator and an insulated outer evaporator cover separating the evaporator from items stored in the upper compartment.
13. The refrigerator freezer of claim 12 wherein the auxiliary heater is located between the insulation and the outer cover of the insulated outer cover.
14. The refrigerator freezer of claim 8 wherein the upper compartment further includes one or more low ambient heaters for the upper compartment connected to a power supply in circuit with a low ambient thermostat arranged to respond to temperature conditions outside the refrigerator freezer to provide heat to the upper compartment when ambient conditions are near to or below freezing to assure that temperatures in the upper compartment remain above freezing.
15. The refrigerator freezer of claim 10 wherein the upper compartment further includes one or more low ambient heaters for the upper compartment connected in circuit with a power supply and a low ambient thermostat arranged to respond to temperature conditions outside the refrigerator freezer to provide heat to the upper compartment when ambient conditions are near to or below freezing to assure that temperatures in the upper compartment remain above freezing when the control is set for operating the upper compartment as an above freezing refrigerator compartment.
16. A convertible refrigerator freezer comprising:
an insulated cabinet having an upper convertible compartment selectively operable by the user as an above freezing refrigerator compartment or as below freezing freezer compartment, and a lower below freezing freezer compartment;
insulation between the upper convertible compartment and the lower freezer compartment;
a refrigerating system for the convertible refrigerator freezer including:
an evaporator mounted adjacent the rear wall of the upper convertible compartment;

10 an evaporator cover forming an evaporator compartment for separating
 the evaporator from the upper convertible compartment;
 an evaporator fan mounted in the evaporator compartment for drawing
 air from the lower freezer compartment and from the upper convertible
 compartment and circulating the air over the evaporator;
 15 a defrost heater adjacent the evaporator for periodically defrosting the
 evaporator
 an air tower for conveying refrigerated air from the evaporator fan to
 the lower freezer compartment through the compartment separator;
 a defrost control for periodically defrosting the evaporator; and
 20 a control for setting the convertible compartment to operate as an above
 freezing refrigerator or as a below freezing freezer compartment including:
 an air controller for selectively discharging a first amount of
 refrigerated air through the evaporator cover to the upper convertible
 compartment when the upper convertible compartment is operated as an
 25 above freezing refrigerator compartment, or a second larger amount of
 refrigerated air through the evaporator cover to the upper convertible
 compartment when the upper convertible compartment is operated as a
 below freezing freezer compartment; and
 an auxiliary heater for the upper convertible compartment and
 30 connected in circuit with a convertible compartment thermostat to
 maintain the upper convertible compartment at above freezing
 temperatures when the control is set for refrigerator operation.

17. The convertible refrigerator freezer of claim 16 wherein the air controller
 includes a control baffle to control the discharge of refrigerated air through the
 evaporator cover into the convertible compartment and to operate a switch to
 connect the auxiliary heater and convertible compartment thermostat to a power
 5 supply when the control is set for refrigerator operation.

18. The convertible refrigerator freezer of claim 17 wherein the air controller
 further includes a first set of louvers in the control, and the control baffle
 comprises a rotatable baffle mounted on a shaft, the rotatable baffle having cutout

opening arranged to selectively align with an air passage from the air tower
5 through the evaporator cover into the upper convertible compartment, whereby
when the baffle cutout is aligned with the air passage the second larger amount of
air passes into the upper convertible compartment through the baffle cutout and
the first set of louvers when the evaporator fan is operating.

19. The convertible refrigerator freezer of claim 17 wherein the control includes a
rotary knob connected to the control baffle for rotating the control baffle to a first
position for closing the air passage and thereby discharging the first amount of
refrigerated air to the upper convertible compartment and to a second position for
5 discharging the second amount of refrigerated air to the upper convertible
compartment, and the control baffle includes a cam on the baffle for operating the
switch to connect the auxiliary heater and convertible compartment thermostat
when the control is set for refrigerator operation.

20. The convertible refrigerator freezer of claim 16 wherein the auxiliary heater is
connected to be energized by the defrost control in addition to the defrost heater
during defrost cycles when the control is set for freezer operation.

21. The refrigerator freezer of claim 16 wherein the upper convertible
compartment further includes one or more low ambient heaters for the upper
compartment connected to a power supply in circuit with a low ambient
thermostat arranged to respond to temperature conditions outside the refrigerator
5 freezer to provide heat to the upper convertible compartment when ambient
conditions are near to or below freezing to assure that temperatures in the upper
convertible compartment remain above freezing, and the one or more low ambient
heaters, and low ambient thermostat are connected to the power supply when the
control is set for operating the upper compartment as an above freezing
10 refrigerator compartment.

22. A convertible refrigerator freezer comprising:

an insulated cabinet having an upper convertible compartment selectively operable by the user as an above freezing refrigerator compartment or as a below freezing freezer compartment, and a lower below freezing freezer compartment;

5 insulation and a compartment separator between the upper convertible compartment and the lower freezer compartment;

an evaporator compartment in the rear of the upper convertible compartment formed by an evaporator cover assembly spaced from the rear wall of the upper convertible compartment including;

10 an inner evaporator cover spaced inwardly from the rear wall of the convertible compartment;

an air tower overlying the inner evaporator cover and connecting an opening in the inner evaporator cover to an opening in the compartment separator for supplying refrigerated air from the evaporator compartment to the freezer compartment;

15 a sheet of insulation material overlying the inner evaporator cover and the air tower;

an outer evaporator cover overlying the insulation material;

a refrigerating system for the convertible refrigerator freezer including:

20 an evaporator mounted in the evaporator compartment;

an evaporator fan mounted in the evaporator compartment for drawing air from the lower freezer compartment through the compartment separator and from the upper convertible compartment and circulating the air over the evaporator and discharging refrigerated air into the air tower for cooling the lower freezer compartment and the upper convertible compartment; and

25 a control for selectively discharging a first amount of refrigerated air from the air tower through the evaporator cover to the upper convertible compartment when the control is set to operate the upper convertible compartment as an above freezing refrigerator compartment, and for discharging a second larger amount of refrigerated air through the evaporator cover to the upper convertible compartment when the control is set to operate the upper convertible compartment as a below freezing freezer compartment.

23. The convertible refrigerator freezer of claim 22 wherein the outer evaporator cover is cooled by the evaporator through the insulation material to provide additional cooling to the upper convertible compartment.
24. The convertible refrigerator freezer of claim 22 further including a defrost heater adjacent the evaporator, a defrost control for periodically energizing the defrost heater to defrost the evaporator, and an auxiliary heater for the upper convertible compartment and connected in circuit with a convertible compartment thermostat, and wherein the control operates a switch to connect the auxiliary heater and convertible compartment thermostat to a power supply when the control is set for refrigerator operation to supply heat to the upper convertible compartment under control of the convertible compartment thermostat during above freezing operation.
25. The convertible refrigerator freezer of claim 24 wherein the auxiliary heater is mounted adjacent the outer evaporator cover.
26. The refrigerator freezer of claim 24 wherein the upper convertible compartment further includes one or more low ambient heaters for the upper convertible compartment connected to a power supply in circuit with a low ambient thermostat arranged to respond to temperature conditions outside the refrigerator freezer to provide heat to the upper convertible compartment when ambient conditions are near to or below freezing to assure that temperatures in the upper convertible compartment remain above freezing, and the one or more low ambient heaters, and low ambient thermostat are connected to the power supply when the control is set for operating the upper convertible compartment as an above freezing refrigerator compartment.
27. The refrigerator freezer of claim 26 wherein the low ambient heaters are located adjacent the outer surface of the sidewalls of the upper convertible compartment.
28. A convertible refrigerator freezer comprising:

an insulated cabinet having an upper convertible compartment selectively operable by the user as an above freezing refrigerator compartment or as a below freezing freezer compartment, and a lower below freezing freezer compartment;

5 insulation between the upper convertible compartment and the lower freezer compartment;

a refrigerating system for the convertible refrigerator freezer including:

an evaporator mounted adjacent the rear wall of the upper convertible compartment;

10 an insulated evaporator cover for separating the evaporator from the upper convertible compartment;

a defrost heater adjacent the evaporator;

a defrost control for periodically energizing the defrost heater for melting accumulated frost and ice on the evaporator;

15 an evaporator fan mounted in the upper convertible compartment for drawing air from the lower freezer compartment and the upper convertible compartment and circulating the air over the evaporator and to the upper convertible compartment and the lower freezer compartment;

20 an auxiliary heater for the upper convertible compartment and connected in circuit with a convertible compartment thermostat and a selector switch operable to a first position to connect the auxiliary heater and convertible compartment thermostat to a power supply; and

25 a control for selectively permitting discharge of a first amount of refrigerated air to the upper convertible compartment and for operating the selector switch to the first position when the control is set to operate the upper convertible compartment as an above freezing refrigerator compartment.

29. The convertible refrigerator freezer of claim 28 wherein the control operates the selector switch to a second position when the control is set to operate the upper convertible compartment as a freezer compartment and, in the second position, the selector switch connects the auxiliary heater and convertible compartment thermostat in circuit with the defrost heater to operate under control of the defrost control to provide additional heat during defrosting.
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30. The convertible refrigerator freezer of claim 29 wherein the control permits discharge of a first amount of refrigerated air from the evaporator fan to the upper convertible compartment when the control is set to operate the upper convertible compartment as an above freezing refrigerator compartment, and the control
5 permits discharge of a second larger amount of refrigerated air from the evaporator fan to the upper convertible compartment when the control is set to operate the upper convertible compartment as a below freezing freezer compartment.
31. The convertible refrigerator freezer of claim 30 wherein the control includes a rotary knob connected to a control baffle for rotating the control baffle to a first position for permitting discharge of the first amount of refrigerated air to the upper convertible compartment and to a second position for permitting discharge
5 of the second amount of refrigerated air to the upper convertible compartment, and the control baffle includes a cam for operating the selector switch to the first position when the control is set to operate the upper convertible compartment as an above freezing refrigerator and to the second position when the control is set to operate the upper convertible compartment as a below freezing freezer .
32. The refrigerator freezer of claim 28 wherein the upper convertible compartment further includes one or more low ambient heaters adjacent the outer surface of the sidewalls of the upper convertible compartment connected to a power supply in circuit with a low ambient thermostat arranged to respond to
5 temperature conditions outside the refrigerator freezer and an upper compartment bi-metal thermostat to respond to temperature conditions in the upper convertible compartment to provide heat to the upper convertible compartment when ambient conditions are near to or below freezing to assure that temperatures in the upper convertible compartment remain above freezing but below above normal
10 refrigerator compartment temperatures, and the one or more low ambient heaters, low ambient thermostat and upper compartment bi-metal thermostat are connected to the power supply when the control is set for operating the upper convertible compartment as an above freezing refrigerator compartment.

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33. A method of manufacturing (i) a refrigerator freezer product having an upper freezer compartment and a lower refrigerator compartment configuration, or (ii) a convertible refrigerator freezer product having an upper convertible compartment selectively operable as an above freezing refrigerator compartment or as a below freezing freezer compartment and a lower freezer compartment configuration

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utilizing a common platform comprising:

providing a common cabinet for use with both product configurations;

providing common compartment liners for use with both product configurations;

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providing a first compartment separator for use in the refrigerator freezer product configuration or a second compartment separator for use in the convertible refrigerator freezer product configuration;

providing a first air system for supplying refrigerated air from an evaporator and evaporator fan in the upper freezer compartment to the upper freezer compartment and lower refrigerated compartment in the refrigerator freezer product configuration including an air tower for directing refrigerated air from the evaporator to the lower refrigerated compartment and to the upper freezer compartment, or providing a second air system for supplying refrigerated air from an evaporator and evaporator fan in the upper convertible compartment to the upper convertible compartment and to the lower freezer compartment in the convertible refrigerator freezer product configuration including an air tower for directing refrigerated air from the evaporator fan to the lower freezer compartment and a control for selectively directing a first amount of refrigerated air from the evaporator fan to the upper convertible compartment when the convertible upper compartment is operated as an above freezing refrigerator compartment, and a second larger amount of refrigerated air to the upper convertible compartment when the upper convertible compartment is operated as a freezer compartment.

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34. The method of manufacturing (i) a refrigerator freezer product or (ii) a convertible refrigerator freezer product of claim 33 further comprising:

providing a first refrigeration system for use in the refrigerator freezer product configuration, or a second refrigeration system for use in the convertible refrigerator freezer product configuration.

35. The method of manufacturing (i) a refrigerator freezer product or (ii) a convertible refrigerator freezer product of claim 33 further comprising:

providing a common door for the lower compartment; and

providing a door with a first inner door panel for the refrigerator freezer product or a door with a second inner door panel for the convertible refrigerator freezer product for the upper compartment.

36. The method of manufacturing (i) a refrigerator freezer product or (ii) a convertible refrigerator freezer product of claim 33 further comprising:

providing a first control system for the refrigerator freezer product, or a second control system for the convertible refrigerator freezer product.

37. A method of manufacturing (i) a refrigerator freezer product having an upper freezer compartment and a lower refrigerator compartment configuration, or (ii) a convertible refrigerator freezer product having an upper convertible compartment selectively operable as an above freezing refrigerator compartment or as a freezer compartment and a lower freezer compartment configuration utilizing a common platform and a common assembly process comprising:

fabricating a common cabinet for use with both product configurations;

fabricating a common upper compartment liner and a common lower compartment liner for use in both product configurations;

assembling a first compartment separator to the upper compartment liner for the refrigerator freezer product configuration, or assembling a second compartment separator to the upper compartment liner for the convertible refrigerator freezer product configuration;

assembling a wiring harness in the common cabinet for connecting electrical components in the upper and lower compartment liners;

assembling a first refrigerant line and heat loop set in the common cabinet for the refrigerator freezer product configuration, or assembling a second refrigerant line and

heat loop set in the common cabinet for the convertible refrigerator freezer product configuration;

- 20 assembling the upper compartment liner to the cabinet;
- assembling the lower compartment liner to the cabinet;
- providing foam in place insulation between the cabinet and the liners;
- assembling a first refrigeration system including an evaporator, defrost heater, condenser and compressor in the refrigerator freezer product configuration, or a second
- 25 refrigeration system including an evaporator, defrost heater, condenser and compressor in the convertible refrigerator freezer product configuration;
- assembling a first evaporator cover including an air tower for transmitting refrigerated air to the lower refrigerator compartment and to the upper freezer compartment in the refrigerator freezer product configuration, or a second evaporator cover assembly
- 30 including an inner evaporator cover, an air tower for transmitting refrigerated air from the evaporator fan to the lower freezer compartment, a sheet of insulation material and an outer evaporator cover in the convertible refrigerator freezer product configuration; and
- assembling a first control for controlling operation of a refrigerator freezer product configuration, or a second control for controlling operation of a convertible product
- 35 configuration wherein the second control includes an air controller for selectively directing a first amount of refrigerated air from the evaporator fan to the upper convertible compartment for operation as an above freezing refrigerator, or a second larger amount of refrigerated air to the convertible compartment for operation as a below freezing freezer;
- 40 assembling a common lower compartment door and door liner; and
- assembling a common upper door having a first inner door for the refrigerator freezer product configuration, or a common upper door having a second inner door for the convertible refrigerator freezer product configuration.

38. The method of manufacturing (i) a refrigerator freezer having an upper freezer compartment and a lower refrigerator compartment configuration, or (ii) a convertible refrigerator freezer product having an upper convertible compartment selectively operable as an above freezing refrigerator compartment or as a freezer compartment and a
- 5 lower freezer compartment as in claim 37 wherein the step of assembling a wiring

harness in the common cabinet comprises assembling a first wiring harness in the cabinet for the refrigerator freezer product configuration, or assembling a second wiring harness in the cabinet for the convertible refrigerator freezer product configuration.